Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A device to process material, comprising:

an energy beam source to generate an energy beam; and

~~at least one~~ a plurality of energy beam transfer ~~device~~ devices operatively connectable to the energy beam source and disposable relative to a single workpiece to be processed, to direct the energy beam in a predetermined pattern on an exterior surface of the workpiece ~~to be processed~~.

Claim 2 (original): The device of claim 1, wherein the energy beam source comprises one of an electron beam system or a laser material processing system.

Claim 3 (original): The device of claim 1, wherein the energy beam transfer device comprises a lens.

Claim 4 (currently amended): The device of claim 1, further comprising:

~~a plurality of energy beam transfer devices; and~~

a switching device to apply the energy beam to each energy beam transfer device to direct the energy beam.

Claim 5 (original): The device of claim 4, further comprising a housing to enclose the energy beam transfer devices and at least a portion of the workpiece to be processed, wherein the housing includes:

a first part; and

a second part, wherein the first part and the second part are movable relative to one another to releasably enclose at least the portion of the workpiece to be processed.

Claim 6 (original): The device of claim 5, further comprising:

a first transfer device support coupled to an interior of the first part of the housing to support a first group of the plurality of energy beam transfer devices; and

a second transfer device support coupled to an interior of the second part of the housing to support a second group of the plurality of energy beam transfer devices.

Claim 7 (original): The device of claim 5, further comprising a workpiece fixture to retain the workpiece in position relative to each of the plurality of transfer devices during a material processing operation.

Claim 8 (original): The device of claim 7, wherein the workpiece fixture comprises a plurality of centering pins to hold the workpiece in position.

Claim 9 (original): The device of claim 8, wherein the workpiece fixture further comprises:

a first pin support coupled to an interior of the first part of the housing to support a first group of pins of the plurality of centering pins; and

a second pin support coupled to an interior of the second part of the housing to support a second group of pins of the plurality of centering pins.

Claim 10 (original): The device of claim 5, wherein the housing is adapted to form a seal around the workpiece to retain the energy beam and any debris within the housing during a material processing operation.

Claim 11 (original): The device of claim 5, further comprising a tool positioner including:

a first operating lever; and

a second operating lever pivotally coupled to the first operating lever to hold the housing in position on the workpiece during a material processing operation.

Claim 12 (original): The device of claim 4, further comprising a fiber optic cable to operatively connect each of the energy beam transfer devices to the energy beam source.

Claim 13 (original): The device of claim 1, wherein the device is adapted to operate in at least one of substantially a vacuum and substantially a zero gravity environment.

Claim 14 (original): The device of claim 1, wherein the workpiece comprises a component on an aerospace vehicle.

Claim 15 (original): The device of claim 1, wherein the predetermined pattern is substantially completely around the exterior surface of the workpiece.

Claim 16 (withdrawn): A device to process material, comprising:

a housing to substantially enclose at least a portion of a workpiece to be processed;

an energy beam source to generate an energy beam; and

means to direct the energy beam on at least one predetermined location on the portion of the workpiece enclosed within the housing.

Claim 17 (withdrawn): The device of claim 16, wherein the means to direct the energy beam comprises a plurality of energy beam transfer devices operatively connectable to the energy beam source and distributable around the workpiece to direct the energy beam in a predetermined pattern on an exterior surface of the workpiece.

Claim 18 (withdrawn): The device of claim 17, further comprising a switching device to apply the energy beam to each transfer device.

Claim 19 (withdrawn): The device of claim 17, wherein the housing comprises:

a first part; and

a second part, wherein the first part and the second part are movable relative to one another to releasably enclose at least the portion of the workpiece.

Claim 20 (withdrawn): The device of claim 19, further comprising:

a first transfer device support coupled to an interior of the first part of the housing to support a first group of the plurality of energy beam transfer devices; and

a second transfer device support coupled to an interior of the second part of the housing to support a second group of the plurality of energy beam transfer devices.

Claim 21 (withdrawn): The device of claim 19, further comprising a workpiece fixture to retain the workpiece in position relative to each of the plurality of transfer devices during a material processing operation.

Claim 22 (withdrawn): The device of claim 19, wherein the housing is adapted to form a seal around the workpiece to retain the energy beam and any debris within the housing during a material processing operation.

Claim 23 (withdrawn): The device of claim 16, wherein the means to direct the energy beam comprises:

a movable frame; and

an energy beam transfer device mounted to the movable frame and operatively connectable to the energy beam source, the energy beam transfer device to direct the energy beam on the at least one predetermined location on the workpiece.

Claim 24 (withdrawn): The device of claim 23, further comprising a drive mechanism to move the movable frame relative to the workpiece.

Claim 25 (withdrawn): The device of claim 24, further comprising at least one drive wheel or gear to move the movable frame relative to the workpiece.

Claim 26 (withdrawn): The device of claim 25, further comprising a controller operatively connected to the at least one drive wheel or gear to move the movable frame to a predetermined location relative to the workpiece.

Claim 27 (withdrawn): The device of claim 25, wherein the movable frame comprises:

a substantially horseshoe shaped member including:

an interior portion adapted to receive and retain the workpiece; and

a substantially circular exterior portion to engage the at least one drive wheel or gear to move the movable frame relative to the workpiece.

Claim 28 (withdrawn): The device of claim 25, further comprising a material processing head mounted to and extending at least partially within the housing.

Claim 29 (withdrawn): The device of claim 28, wherein the at least one drive wheel or gear is rotatably mounted to the material processing head.

Claim 30 (withdrawn): A device to inspect a workpiece, comprising:

a movable frame;

a laser holographic exciter mounted to the movable frame; and

at least one laser reader mounted to the movable frame, wherein the movable frame is adapted to be movable relative to the workpiece during an inspection process.

Claim 31 (withdrawn): The device of claim 30, further comprising a drive mechanism to move the movable frame relative to the workpiece.

Claim 32 (withdrawn): The device of claim 31, further comprising a workpiece support member attached to the movable frame and adapted to engage and move relative to the workpiece during an inspection process.

Claim 33 (withdrawn): The device of claim 31, further comprising at least one drive wheel or gear to move the movable frame relative to the workpiece.

Claim 34 (withdrawn): The device of claim 33, wherein the movable frame comprises a substantially horseshoe shaped member including:

an interior portion adapted to receive and retain the workpiece; and

a substantially circular exterior portion to engage the at least one drive wheel or gear to move the movable frame relative to the workpiece.

Claim 35 (withdrawn): The device of claim 33, further comprising a housing to enclose at least the movable frame and at least a portion of the workpiece under inspection, wherein the housing includes:

a first part; and

a second part movable relative to the first part to releasably enclose at least the portion of the workpiece under inspection.

Claim 36 (withdrawn): The device of claim 35, further comprising an inspection head mounted to at least one of the first and second parts of the housing and extending at least partially within the housing.

Claim 37 (withdrawn): The device of claim 36, wherein the at least one drive wheel or gear is rotatably mounted to the inspection head.

Claim 38 (withdrawn): The device of claim 35, wherein the laser holographic exciter discharges laser light and the housing is adapted to form a seal around the workpiece to retain the laser light within the housing during inspection.

Claim 39 (withdrawn): The device of claim 30, further comprising:

a laser holographic emitter; and

a fiber optic cable to operatively connect the laser holographic emitter to the laser holographic exciter.

Claim 40 (withdrawn): A device to process material, comprising:

a base member adapted to releasably hold a portion of material to be attached to a workpiece;

a track mounted to the base member; and

a material processing system adapted to move along the track to perform a material processing operation.

Claim 41 (withdrawn): The device of claim 40, further comprising:

a drive motor; and

a carriage drive arm to couple the material processing system to the drive motor to move the material processing system along the track.

Claim 42 (withdrawn): The device of claim 40, wherein the material processing system comprises one of an energy beam system or a laser material processing system.

Claim 43 (withdrawn): The device of claim 40, further comprising a laser holographic inspection system adapted to move along the track to perform an inspection operation on the workpiece.

Claim 44 (withdrawn): The device of claim 43, further comprising:

a drive motor; and

a carriage drive arm to couple the laser holographic system to the drive motor to move the laser holographic system along the track.

Claim 45 (withdrawn): The device of claim 40, wherein the processing operation comprises at least one of joining, welding, cutting, and inspecting.

Claim 46 (withdrawn): The device of claim 40, wherein the workpiece is an aerospace vehicle.

Claim 47 (withdrawn): The device of claim 40, wherein the portion of material is an ISO grid repair patch.

Claim 48 (withdrawn): A device to process material, comprising:

a base member;

a first track mounted to the base member;

a carriage including a bottom portion and a top portion, the bottom portion being adapted to move along the first track;

a second track slidably mounted to the top portion of the carriage; and

a material processing system mounted to the second track to perform a material processing operation on a workpiece.

Claim 49 (withdrawn): The device of claim 48, further comprising:

a drive motor; and

a carriage drive arm to couple the material processing system to the drive motor to move the material processing system along the first track.

Claim 50 (withdrawn): The device of claim 48, further comprising:

a second carriage including a bottom portion and a top portion, the bottom portion being adapted to move along the first track;

a third track slidably mounted to the top portion of the second carriage; and

a laser holographic inspection system mounted to the third track to perform an inspection operation on the workpiece.

Claim 51 (withdrawn): The device of claim 50, further comprising a carriage drive arm to couple the laser holographic system to the drive motor to move the laser holographic system along the track.

Claim 52 (withdrawn): A device to inspect a workpiece, comprising:

a base member;

a track mounted to the base member; and

an inspection system adapted to move along the track to perform an inspection operation on a workpiece.

Claim 53 (withdrawn): The device of claim 52, further comprising:

a drive motor; and

a carriage drive arm to couple the inspection system to the drive motor to move the inspection system along the track.

Claim 54 (withdrawn): The device of claim 52, wherein the inspection system comprises a laser holographic inspection system.

Claim 55 (withdrawn): A method of making a device to process material, comprising:

providing an energy beam source to generate an energy beam;

disposing at least one energy beam transfer device to direct the energy beam in a predetermined pattern on an exterior surface of a workpiece; and

operatively connecting the at least one energy beam transfer device to the energy beam source.

Claim 56 (withdrawn): The method of claim 55, wherein providing the energy beam source comprises providing one of an electron beam system or a laser material processing system.

Claim 57 (withdrawn): The method of claim 55, wherein disposing the at least one energy beam transfer devices comprises disposing a plurality of lenses relative to the workpiece.

Claim 58 (withdrawn): The method of claim 55, further comprising providing a switching device to apply the energy beam to each transfer device of a plurality of transfer devices to direct the energy beam at predetermined locations on the exterior surface of the workpiece.

Claim 59 (withdrawn): The method of claim 58, further comprising forming a housing to enclose at least the energy beam transfer devices and at least a portion of the workpiece to be processed, wherein forming the housing includes:

providing a first part; and

providing a second part movable relative to the first part to releasably enclose the portion of the workpiece to be processed.

Claim 60 (withdrawn): The method of claim 59, further comprising:

coupling a first transfer device support to an interior of the first part of the housing to support a first group of the plurality of energy beam transfer devices; and

coupling a second transfer device support to an interior of the second part of the housing to support a second group of the plurality of energy beam transfer devices.

Claim 61 (withdrawn): The method of claim 59, further comprising providing a workpiece fixture to retain the workpiece in position relative to each of the plurality of transfer devices during a material processing operation.

Claim 62 (withdrawn): The method of claim 59, wherein the housing is formed to provide a seal around at least the portion of the workpiece to be processed to retain the energy beam and any debris within the housing during a material processing operation.

Claim 63 (withdrawn): The method of claim 55, further comprising adapting the device to operate in at least one of substantially a vacuum and substantially a zero gravity environment.

Claim 64 (withdrawn): The method of claim 55, wherein disposing the at least one energy beam transfer device comprises mounting the at least one energy beam transfer device to a movable frame to direct the energy beam in the predetermined pattern.

Claim 65 (withdrawn): The method of claim 64, wherein mounting the at least one energy beam transfer device comprises mounting a lens to the movable frame.

Claim 66 (withdrawn): A method of making a device to inspect a workpiece, comprising:

providing a movable frame adapted to move relative to the workpiece;

mounting a laser holographic exciter to the movable frame; and

mounting at least one laser reader to the movable frame.

Claim 67 (withdrawn): The method of claim 66, further comprising providing a drive mechanism to move the movable frame relative to the workpiece.

Claim 68 (withdrawn): The method of claim 67, wherein providing the movable frame comprises providing a substantially horseshoe shaped member including:

an interior portion adapted to receive and retain the workpiece; and

a substantially circular exterior portion adapted to engage the drive mechanism to move the movable frame relative to the workpiece.

Claim 69 (withdrawn): The method of claim 67, further comprising forming a housing to enclose at least the movable frame and at least a portion of the workpiece under inspection, wherein forming the housing includes:

providing a first part; and

providing a second part movable relative to the first part to releasably enclose the portion of the workpiece under inspection.

Claim 70 (withdrawn): A method of making a device to process material, comprising:

providing a base member;

mounting a track to the base member; and

providing a material processing system adapted to move along the track to perform a material processing operation on a workpiece.

Claim 71 (withdrawn): The method of claim 70, further comprising:

providing a drive motor; and

coupling the material processing system to the drive motor to move the material processing system along the track.

Claim 72 (withdrawn): The method of claim 70, further comprising providing a laser holographic inspection system adapted to move along the track to perform an inspection operation on the workpiece.

Claim 73 (withdrawn): The method of claim 72, further comprising:

providing a drive motor; and

coupling the laser holographic system to the drive motor to move the laser holographic system along the track.

Claim 74 (withdrawn): A method of processing material, comprising:

generating an energy beam; and

directing the energy beam in a predetermined pattern on a workpiece through at least one energy beam transfer device.

Claim 75 (withdrawn): The method of claim 74, wherein directing the energy beam comprises applying the energy beam to a plurality of energy beam transfer devices with a switching device.

Claim 76 (withdrawn): The method of claim 74, wherein directing the energy beam comprises directing one of an electron beam or a laser beam on the workpiece.

Claim 77 (withdrawn): The method of claim 74, further comprising enclosing the energy beam and at least a portion of the workpiece to be processed in a housing.

Claim 78 (withdrawn): The method of 74, further comprising positioning an energy beam transfer device at a predetermined location relative to the workpiece.

Claim 79 (withdrawn): The method of claim 78, wherein positioning the energy transfer device comprises moving a frame attached to the energy beam transfer device relative to the workpiece.

Claim 80 (withdrawn): A method of inspecting a workpiece, comprising:

projecting a laser holographic pattern on the workpiece;

moving the laser holographic pattern around a portion of the workpiece to be inspected; and

detecting any defects in the workpiece by observing the laser holographic pattern.

Claim 81 (withdrawn): The method of claim 80, further comprising enclosing at least a portion of the workpiece to be inspected in a housing.

Claim 82 (withdrawn): The method of claim 80, wherein detecting any defects comprises observing the laser holographic pattern with at least one laser reader.

Claim 83 (withdrawn): The method of claim 80 wherein moving the laser holographic pattern comprises moving a laser holographic exciter relative to the workpiece.

Claim 84 (withdrawn): A method of processing material, comprising:

moving a material processing system along a predetermined path to perform a material processing operation; and

moving an inspection system along the predetermined path to perform an inspection operation.

Claim 85 (withdrawn): The method of claim 84, further comprising releasably holding and positioning a portion of material to be attached to a workpiece.

Claim 86 (withdrawn): The method of claim 85, wherein the portion of material comprises an ISO grid repair patch.

Claim 87 (withdrawn): The method of claim 85, further comprising directing a energy beam from the material processing system to attach the portion of material to the workpiece.

Claim 88 (withdrawn): The method of claim 87, wherein directing the energy beam comprises directing one of an electron beam or a laser beam material processing system.

Claim 89 (withdrawn): The method of claim 84, wherein moving the material processing system along the track comprises driving the material processing system with a carriage drive arm propelled by a drive motor.

Claim 90 (withdrawn): The method of claim 84, wherein moving an inspection system comprises moving a laser holographic inspection system along the predetermined path;

Claim 91 (withdrawn): The method of claim 90, further comprising detecting any defects by observing a laser holographic pattern projected on the processed material.

Claim 92 (withdrawn): The method of claim 90, wherein moving the laser holographic inspection system along the track comprises driving the laser holographic inspection system with a carriage drive arm propelled by a drive motor.

Claim 93 (new): A device to process material, comprising:

a housing to enclose at least a portion of a workpiece to be processed, wherein the housing includes:

a first part; and

a second part, wherein the first part and the second part are pivotally coupled to one another to releasably enclose at least the portion of the workpiece to be processed; and

an energy beam transfer device disposed in the housing to direct an energy beam on the workpiece.

Claim 94 (new): The device of claim 93, wherein the housing further comprises:

a hinge to pivotally couple the first and second parts of the housing to one another; and

a biasing mechanism to clamp the first and second parts together to enclose at least the portion of the workpiece to be processed.

Claim 95 (new): The device of claim 93, wherein the housing further comprises a lever to admit and release the workpiece, wherein the lever is biased to urge the first and second parts together.

Claim 96 (new): The device of claim 93, wherein the housing further comprises a structure to form a substantially atmospherically tight seal between the housing and the workpiece.

Claim 97 (new): The housing of claim 96, wherein the seal is formable to be maintained in at least one of substantially a vacuum and substantially a zero gravity environment.

Claim 98 (new): The device of claim 93, wherein the housing further comprises a workpiece fixture to retain the workpiece in position relative to the energy beam transfer device.

Claim 99 (new): The device of claim 93, wherein the energy beam transfer device is in a fixed position relative to the workpiece.

Claim 100 (new): The device of claim 93, wherein the energy beam transfer device is movable within the housing relative to the workpiece.

Claim 101 (new): A device to process material, comprising:

a nonflexible housing to enclose at least a portion of a workpiece to be processed, wherein the housing includes:

a rigid first part;

a rigid second part, wherein the first part and the second part are movable relative to one another to releasably enclose at least the portion of the workpiece to be processed; and

an energy beam transfer device mounted in the housing to direct an energy beam on the workpiece.

Claim 102 (new): The device of claim 101, wherein the housing comprises a substantially cubical shape and each part comprises a substantially triangular cross-section.

Claim 103 (new): The device of claim 102, wherein the first part and the second part are pivotally coupled to one another at an edge of the substantially triangular cross-section.

Claim 104 (new): The device of claim 103, further comprising a biasing mechanism to urge open edges of the first and second parts together to enclose at least the portion of the workpiece to be processed.

Claim 105 (new): The device of claim 103, wherein the energy transfer device is moveable within the housing relative to the workpiece to be processed.